Ultrashort spatiotemporal optical solitons in quadratic nonlinear media: Generation of line and lump solitons from few-cycle input pulses

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Résumé en anglais	By using a powerful reductive perturbation technique, or a multiscale analysis, a generic Kadomtsev-Petviashvili evolution equation governing the propagation of femtosecond spatiotemporal optical solitons in quadratic nonlinear media beyond the slowly varying envelope approximation is put forward. Direct numerical simulations show the formation, from adequately chosen few-cycle input pulses, of both stable line solitons (in the case of a quadratic medium with normal dispersion) and of stable lumps (for a quadratic medium with anomalous dispersion). Besides, a typical example of the decay of the perturbed unstable line soliton into stable lumps for a quadratic nonlinear medium with anomalous dispersion is also given.
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